Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	179	"3729705" "4435984" "4701892" "4709357" "4733380" "4744030" "4785175" "4805156" "4809237" "4834209" "4867264" "4896303" "5089989" "5164548" "5274604" "5644550" "5736642" "5763773" "5841734"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 09:54
S2	56	"5877996" "6195092" "6208586" "6347282" "6374913"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 09:54
S3	233	S1 S2	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:10
S4	0	("L0001L2").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/05/04 09:54
S5	51	(("3729705") or ("4435984") or ("4701892") or ("4709357") or ("4733380") or ("4744030") or ("4785175") or ("4805156") or ("4809237") or ("4834209") or ("4867264") or ("4896303") or ("5089989") or ("5164548") or ("5274604") or ("5644550") or ("5736642") or ("5763773") or ("5841734") or ("5877996") or ("6195092") or ("6208586") or ("6347282") or ("6374913")).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/05/04 09:55
S7	259	367/27.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:10
S8	147	367/31.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:10

S9	0	367/35.ccls. and ((fan adj beam) or fan-beam)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:21
S10	0	367/27-35.ccls. and ((fan adj beam) or fan-beam)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:48
S11	4	labry.in.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:51
S12	106	367/25.ccls. and (tubing or tubular)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:52
S13	57	((time adj gate) or time-gate) and (tubing or tubular) and (borehole or "bore hole")	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:53
S14	161	S12 S13	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:56
S15	388	702/6.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:57
S16	274	181/102.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:57

S17	53	181/103.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:57
S18	170	181/104.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:57
S19	174	181/105.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:57
S20	294	181/106.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:57
S21	600	181/102-105.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/04 10:57
S22	51	(("3729705") or ("4435984") or ("4701892") or ("4709357") or ("4733380") or ("4744030") or ("4785175") or ("4805156") or ("4809237") or ("4834209") or ("4867264") or ("4896303") or ("5089989") or ("5164548") or ("5274604") or ("5644550") or ("5736642") or ("5763773") or ("5841734") or ("5877996") or ("6195092") or ("6208586") or ("6347282") or ("6374913")).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/05/31 11:59
S23	389	702/6.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/31 14:00

S25	266	73/152.57,152.58.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/31 14:47
S26	4696	borehole and interface	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/31 14:48
S27	81	borehole and interface and (time with window) and rotate	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/31 15:03
S28	2	D413925	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/05/31 15:03
S29	58	((time adj gate) or time-gate) and (tubing or tubular) and (borehole or "bore hole")	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/06/01 09:14
S30	18	((time adj gate) or time-gate) and (tubing or tubular) and (borehole or "bore hole") and (seismic or acoustic)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/06/01 09:14

S31	56	("3265151" | "3668619" | "3736552" | "3745812" | "3747702" | "3978939" | "4003244" | "4130816" | "4197921" | "4255798" | "4283953" | "4293933" | "4524433" | "4596143" | "4601024" | "4607352" | "4641724" | "4665511" | "4685091" | "4685092" | "4703427" | "4709357" | "4727591" | "4733380" | "4805156" | "4852069" | "4867264" | "4885723" | "4928269" | "4999817" | "5001676" | "5031155" | "5081613" | "5097482" | "5146050" | "5162994" | "5164548" | "5184623" | "5212353" | "5214614" | "5216638" | "5228006" | "5228007" | "5233993" | "5235857" | "5235983" | "5235984" | "5245586" | "5249577" | "5251047" | "5257265" | "5377160" | "5392652" | "5418335" | "5491668").PN. OR ("6125079").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 09:45
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S33	58	S31 S32	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 09:53
S34	34	("3406779" | "3406780" | "3503038" | "3511334" | "3518679" | "3550075" | "3553640" | "3668619" | "3949352" | "4255798" | "4641724" | "4852069" | "4885723").PN. OR ("5001676").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 11:02
S35	17	("2825044" | "4255798" | "4587641" | "4709357" | "4733380").PN. OR ("4912683").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 11:09
S36	24	("3175639" | "4255798" | "4382290" | "4571693").PN. OR ("4685092").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:31

S37	34	("3406779" | "3406780" | "3503038" | "3511334" | "3518679" | "3550075" | "3553640" | "3668619" | "3949352" | "4255798" | "4641724" | "4852069" | "4885723").PN. OR ("5001676").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:31
S38	17	("2825044" | "4255798" | "4587641" | "4709357" | "4733380").PN. OR ("4912683").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:31
S39	24	("3175639" | "4255798" | "4382290" | "4571693").PN. OR ("4685092").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:31
S40	66	S37 S38 S39	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:35
S41	15	wright.in. and borehole and casing	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:35
S42	18	wright.in. and borehole and casing	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/06/01 16:35
S43	26	("3697937" | "4131875" | "4218766" | "4255798" | "4685092" | "4703427" | "4928269").PN. OR ("5216638").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:36
S44	9	("4131875" | "4218766" | "4685092" | "4703427" | "4928269" | "5089989" | "5216638").PN. OR ("6041861").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:37
S45	26	("3401772" | "3401773" | "4255798" | "4703427" | "4709357" | "4733380" | "4757479").PN. OR ("4928269").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:39
S46	32	("3265151" | "3291247" | "3291248" | "3292146" | "3401773" | "4217659" | "4255798" | "4382290" | "4551823" | "4596143").PN. OR ("4703427").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:40
S47	376	seismic and borehole and casing and (window or sample$)	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:41
S48	17	seismic and borehole and casing and (window with sample$)	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:41
S49	9	("4796237" | "4885722" | "4928269" | "4951266").PN. OR ("5274604").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:50
S50	1078	borehole and casing and (tubular or tubing) and perpendicular	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:51

S51	10	borehole and casing and (tubular or tubing) and (perpendicular with (reflect or reflection or reflected))	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:52
S52	143	367/31.ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:52
S53	427	(seismic or acoustic) and (cement with (bond or evaluation))	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:59
S54	170	(seismic or acoustic) and (cement with (bond or evaluation)) and (gate or window)	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 17:00
S55	72	(seismic or acoustic) and (cement with (bond or evaluation)) and (gate or window) and sample	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/01 16:55
S56	175	367/35.ccls.and depth	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 15:38
S57	78	"367"/$.ccls. and borehole and televiewer	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 15:38
S58	247	367/35.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/06/02 10:14
S59	16	("2484623" | "2538114" | "3914987" | "4255798" | "4382290" | "4709357" | "4733380" | "4916648" | "4970695" | "5146432" | "5491668" | "5591913"). PN. OR ("5874676").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 11:00
S60	11	("3553640" | "4254481" | "4691307" | "4837753").PN. OR ("4916648").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 11:43
S61	175	181/105.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/06/02 15:27
S62	703576	367/35.ccls.and depth	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 15:37
S63	78	"367"/$.ccls. and borehole and televiewer	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 15:37
S64	703583	S62 S63	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 15:37

S65	703583	S62 S63	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 15:37
S66	175	367/35.ccls.and depth	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 15:38
S67	78	"367"/$.ccls. and borehole and televiewer	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 15:38
S68	227	S66 S67	US-PGPUB; USPAT; USOCR	OR	ON	2005/06/02 15:38

Query/Command : his

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File : TULSA

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  2         4  (CEMENT 3D BOND+) AND (BOREHOLE OR TUBING) AND PERPENDICULAR
  3        33  (CEMENT 3D BOND+) AND (BOREHOLE OR TUBING) AND (GATE OR WINDOW
               )

Search statement   4
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1 / 33 TULSA - ©TULS

TI - NEW DOWNHOLE TECHNOLOGIES TACKLE MULTIFACETED ENVIRONMENTS

SO - OIL GAS J V 102, NO 8, PP 41-46, 2004.02.23 (COLOR)

AU - MORITIS, G

AB - Various new downhole technologies allow companies to optimize the production of petroleum resources from wells with more complex geometries and producing horizons that are in deeper water, coalbeds, deeper and tighter formations, and accumulations containing heavier oil or bitumen. These technologies include new production logging tools, intelligent completions, downhole pumps, expandable tubulars, frac fluids, and other completion technologies. This downhole technology report discusses and provides a description of several new technologies and downhole equipment. Aspects of production logging are described with examples offered by Schlumberger Oilfield Services, including usage of well tractors in deviated and horizontal wells. Intelligent well completions are discussed with means to control and monitor downhole flow with offshore examples in the North Sea and Marlim Sul oil field. Dewatering of coalbed methane wells has spurred new, more economic and efficient artificial lift methods with newly designed electric submersible pumps to work at deep or shallow well depths. Other technologies noted include advances in a biodegradable fracturing fluid, expandable tubulars with a **window** exit, and new cladding material that allows the tubulars to set directly against a formation without cementing. Monobore completions and equipment are also discussed.

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2 / 33 TULSA - ©TULS

TI - CEMENTING TECHNOLOGY FOR **WINDOW** MILLED AND SIDETRACKED SLIM HOLE

SO - OIL DRILLING PROD TECHNOL V 25, NO 2, PP 29-31;88-89, 2003.04.20 (1 REF; IN CHINESE)

AU - JIANG, H; WANG, Y; HAN, Z; LIU, Y

AB - (Full article and English abstract available from T.U.)

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3 / 33 TULSA - ©TULS

TI - A DOWNHOLE DEVICE, E.G., A CENTRALISER

SO - GR BRIT 2,385,342A, P 2003.08.20, F 2003.01.30, PR GR BRIT 2002.02.05 (APPL 0,202,555) AND GR BRIT 2002.07.12 (APPL 0,216,045) (E21B-017/10; E21B-019/24) (29 PP; 34 CLAIMS)

AU - WHITELAW, H; ARIF, S

AB - A downhole device is applicable as a casing centralizer to support the casing away from the wellbore wall. It comprises an annular body formed of a polymer-based material and a sheath which is made from a metallic material. The polymeric nature of the annular body provides improved torque resistance and low friction characteristics to the device, and the sheath provides increased structural strength to the device and reduces tendency to swage. The annular body may be molded around the sheath, or the sheath molded around the annular body. The annular body may be formed by two or more parts that are clipped together. Alternatively, two parts of the body may be hinged together. The sheath would then be similarly hinged. The blades may be hollow and have openings therein to allow fluid to flow therethrough.

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4 / 33 TULSA - ©TULS

TI - AN APPLICATION OF CASING **WINDOW** CUTTING TECHNOLOGY FOR OLD WELL RECONSTRUCTION IN TUHA OIL FIELD

SO - WELL TESTING V 11, NO 6, PP 44-47,50,72, 2002.12.25 (IN CHINESE)

AU - CUI, Y

AB - (Full article and English abstract available from T.U.)

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5 / 33 TULSA - ©TULS

TI - RESEARCH ON LINER BUMP-PRESSURE CEMENTING TECHNIQUE OF SLOT SIDETRACKING SLIM HOLE SHAN 7-10C

SO - NATUR GAS IND V 23, NO 1, PP 6A,50-52, 2003.01.25 (2 REFS; IN CHINESE)

AU - GU, J; XIANG, Y; QIANG, F; WANG, X

AB - (Full article and English abstract available from T.U.)

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6 / 33 TULSA - ©TULS

TI - IMPROVE THE CEMENTING QUALITY OF SIDETRACKING SLIM HOLE BY REAMING

SO - OIL DRILLING PROD TECHNOL V 24, NO 5, PP 33-35,84, 2002.10.20 (2 REFS; IN CHINESE)

AU - LI, M

AB - (Full article and English abstract available from T.U.)

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7 / 33 TULSA - ©TULS

TI - APPLICATION OF MULTILATERAL TECHNOLOGY IN DRILLING AN OFFSHORE WELL, INDONESIA

SO - SPE ASIA PACIFIC OIL & GAS CONF (MELBOURNE, AUSTRALIA, 2002.10.08-10) PROC 2002 (SPE-77829; AVAILABLE ON CD-ROM; COLOR; 8 PP; 2 REFS)

AU - TANJUNG, E; SARIDJO, R; PROVANCE, S M; BROWN, P; O'ROURKE, T

AB - A case study is presented of the implementation of multilateral technology for Repsol-YPF Maxus in East Rama field, Southeast Sumatra concession, Indonesia. One pilot well, East Rama AC-6P, was drilled vertically and the other pilot, East Rama AC-7P, was drilled directionally by sidetracking from the East Rama AC-6P surface casing. These pilot wells successfully discovered two hydrocarbon bearing pay sands in the Talang Akar formation. Based on this success, the East Rama field had a need to drill additional producing wells. With the slot limitation on the platform (i.e., one available slot coupled with the desire to achieve optimal reservoir recovery), multilateral technology was selected. This paper categorizes the reasons for choosing a multilateral well as the development option, planning and preparation of the well, and the results of the operations. Issues covered include strategic well design, economic analysis, and the problems encountered during drilling operation. The lessons learned are documented.

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8 / 33 TULSA - ©TULS

TI - BALANCE BETWEEN FORMATION DAMAGE AND WELLBORE DAMAGE: WHAT IS THE CONTROLLING FACTOR IN UBD (UNDERBALANCED DRILLING) OPERATIONS?

SO - SPE FORMATION DAMAGE CONTR INT SYMP (LAFAYETTE, LA, 2002.02.20-21) PROC 2002 (SPE-73735; AVAILABLE ON CD-ROM; 8 PP; 9 REFS)

AU - GUO, B

AB - UBD is an effective means of formation damage control during drilling. However, there is a trade-off between formation damage and wellbore damage in UBD. While the highest bottomhole pressure during normal drilling condition affects the degree of formation damage, the lowest bottomhole pressure during pipe connection controls severity of the wellbore damage. Both the highest bottomhole pressure and the lowest bottomhole pressure are controlled by the combination of the liquid and gas flow rates. A new procedure to approach the

optimum design of liquid and gas flow rate combinations for UBD is presented. The optimum flow rate combinations are selected from a liquid-gas rate **window**. In developing the liquid-gas rate **window**, formation fluid pressure limits the upper bound of the flowing bottomhole pressure, and wellbore collapse pressure serves the lower bound of the circulation-breaking bottomhole pressure. The **window** is closed by the fluid's cutting-carrying capacity and wellbore washout criteria. A procedure for optimizing mud and gas flow rates in UBD is presented.

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9 / 33 TULSA - ©TULS

TI - TECHNOLOGY REMEDIATES SCP (SUSTAINED CASING PRESSURE) PROBLEM

SO - AMER OIL GAS REPORTER V 44, NO 9, PP 74,76,78, SEPT 2001 (COLOR)

AU - TERRILL, B

AB - SCP has been a recognized problem for the oil and gas industry in every major producing region of the world. Left unattended, the potential exists for reduced well production, at the least, to complete loss of the well or catastrophic destruction of the surface facilities. Fortunately, no known injuries and only minor pollution have been attributed to SCP in the Gulf of Mexico Outer Continental Shelf (OCS). SCP has been recorded in more than 11,000 casing strings in more than 8,000 wells on the OCS. Sustained casing pressure is defined as any pressure in the annuli of the casing strings (with the exception of the drive or structural strings) that will not bleed to zero psi in less than a 24-hr period, or will not remain at zero after bleeding. SCP can be caused by leaks in the **tubing**, casing, packers, and/or wellhead pack-offs, as well as poor primary cement jobs or failed **cement bonds** resulting from well stresses. Sustained casing pressure in the outer casing strings is primarily caused by a poor or failed cement job. The channeling of fluids through unset cement, as well as fractures and microannuli caused by well stresses after setting, are causes of SCP in outer casing strings. Once SCP occurs in the outer casing strings, remediation is difficult.

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10 / 33 TULSA - ©TULS

TI - SIDETRACKING TECHNOLOGY IN WENMINGZHAI OILFIELD

SO - OIL DRILLING PROD TECHNOL V 22, NO 3, PP 30-32,84, 2000.06.20 (IN CHINESE)

AU - ZHANG, Z; GUO, B; QIAO, S; PEI, X

AB - (Full article and English abstract available from T.U.)

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11 / 33 TULSA - ©TULS

TI - MLTBS (MULTI-LATERAL TIE BACK SYSTEM) PROJECT CHALLENGING FOR RESERVOIR BENEFITS

SO - SPE ASIA PACIFIC CONF (YOKOHAMA, JAPAN, 2000.04.25-26) PROC 2000 (SPE-59433; AVAILABLE ON CD-ROM; 12 PP; 3 REFS)

AU - KIKUCHI, S; FADAQ, A S

AB - Multilateral completion technology is evolving rapidly. ZADCO (Zakum Development Co.), in conjunction with Abu Dhabi National Oil Co., Japan Oil Development Co., Japan National Oil Corp.-Technology Research Center, Abu Dhabi Marine Operating Co. and Sperry-Sun Drilling Services, has successfully completed MLTBS Phase-1, utilizing an existing well, a level 5 TAML (Technology Assessment Multi-Laterals) completion, and level 4 TAML hydraulic isolation. Multilateral technology application for the existing well was the first achievement in the world. In addition, several new technologies such as running and full cementing 7-in. liner in 8.5-in. lateral, recording cement evaluation logs over the cased lateral using tough logging condition system, and perforating the cased lateral with one run using **tubing** conveyed perforator were implemented in UAE.

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TI - APPARATUS, SYSTEM AND METHOD FOR PROCESSING ACOUSTIC SIGNALS TO IMAGE BEHIND REFLECTIVE LAYERS

SO - WORLD 98/52,033, P 1998.11.19, F 1998.05.14, PR US 1997.05.14 (APPL 856,112), US 1997.05.14 (APPL 856,113), US 1997.05.14 (APPL 856,114) AND US 5/14/1997 (APPL 856,115) (G01N-029/10; B60B-001/08; G01V-001/44) (73 PP; 52 CLAIMS)

AU - BIRCHARK, J R; MANDAL, B; MASINO, J E; MINEAR, J W; RITTER, T E

AB - A system for acoustically imaging a target region behind an acoustically reflective layer includes a transducer configuration for acquiring acoustic image data from the reflective layer and target region. The reflective layer and target region are divided into voxels circumferentially disposed about a central point. The system includes a mechanism for processing the data wherein the suppressing mechanism facilitates the acquisition of image data from the target region. A transducer configuration of an acoustic sensing tool determines the consistency of a first medium disposed between a layer having a greater acoustic reflectivity than the first medium and a second medium, the sensing tool including a rotating head, wherein the tool comprises first, second and third transducer pairs in a spaced apart configuration, each pair comprising a transmitting transducer for transmitting an acoustic radiation signal in an insonified zone, and a receiving transducer having a receiving radiation pattern in an insonified zone.

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TI - OPTIMUM FLUID DESIGN FOR DRILLING AND CEMENTING A WELL DRILLED WITH COIL **TUBING** TECHNOLOGY

SO - 3RD SPE HORIZONTAL WELL TECHNOL INT CONF (CALGARY, CAN, 1998.11.01-04) PROC PP 209-218, 1998 (SPE-50405; 12 REFS)

AU - SVENDSEN, O; SAASEN, A; VASSOY, B; SKOGEN, E; MACKIN, F; NORMANN, S H

AB - The strategy and design of the drilling fluid and cement operations are described for the first 2 wells drilled with Coil **Tubing** on the Gullfaks field. Excellent hole cleaning was achieved in both both wells. A serious problem of differential sticking was eliminated by a radical change in drilling fluid strategy and design. It was possible to successfully drill a 3.75-in. hole, log and run/cement a 2-7/8-in. liner at a maximum inclination of 122(deg). A virtually solids-free potassium formate brine/polymer drilling fluid with a density from 1.50 to 1.56 g/cc was used. The flow properties of the drilling fluid is characterized by a very low fluid loss due to a high extensional viscosity, a low viscosity at all shear rates and a low degree of shear-thinning.

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14 / 33 TULSA - ©TULS

TI - PLANNING FOR SUCCESSFUL **WINDOW** MILLING OPERATION

SO - ANNU SPE TECH CONF (NEW ORLEANS, 98.09.27-30) PROC (DRILLING AND COMPLETION) PP 727-732, 1998 (SPE-49255)

AU - DEWEY, C H; CHILDERS, R D

AB - One of the important aspects of reëntry drilling is to mill a **window** in the existing casing and sidetrack the well bore. In order to achieve a successful **window** milling operation, the following 10 points must be addressed and situations resolved prior to commencing with the casing exit operation: (1) selection of best place to set and to orient the whip-stock; (2) hole angle; (3) radius of curvature (build, drop, left or right turn) in the vicinity of casing exit; (4) whip face orientation methods (MWD, gyros); (5) flexure characteristics of the bottom-hole assembly and resulting dogleg severity; (6) length of sidetracking assembly; (7) depth of rat hole to facilitate drilling objective (short, medium or long radius) after milling **window**; (8) casing conditions; (9) formation types; and (10) retrievability of whip-stock assembly. Recommendations and guidelines for planning a successful **window**-milling project are presented.

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15 / 33 TULSA - ©TULS

TI - MULTI-LATERAL CASE HISTORIES IN THE THAILAND, MALAYSIA AND BRUNEI AREA

SO - IADC/SPE ASIA PACIFIC DRILLING TECHNOL CONF (JAKARTA, INDON, 98.09.07-09) PROC PP 253-260, 1998 (IADC/SPE-47810; 3 REFS)

AU - EMERSON, A B; JONES, R C; LIM, S B

AB - The key to a successful implementation of a multilateral well begins at the well selection phase based on the reservoir and ends with a team approach during operations and a thorough, post-job analysis. This paper discusses the case histories of 5 multilateral wells that have been completed in Thailand, Malaysia and Brunei, and discusses lessons learned. The wells were completed with level 3, 4, and 5 technology. Level 3 utilizes a flow-through divertor and/or a slotted liner placed across the lateral **window** junction. Level 4 is defined as having a cased and cemented main bore with a cased and cemented lateral liner in order to provide full mechanical support at the junction. Level 5 is defined as a system offering hydraulic isolation of the junction through the use of additional straddling completion equipment.

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16 / 33 TULSA - ©TULS

TI - DOWNHOLE TOOL

SO - EUROPE 837,217, P 98.04.22, F 97.09.22, PR US 96.09.20 (APPL 706,143) (E21B-047/00) (23 PP; 22 CLAIMS)

AU - BIRCHAK, J R; MANDAL, B; STROUD, J W; MINEAR, J W

AB - A **cement bond** imaging tool is described that can detect and distinguish between bad **bonds** and other innocuous **cement** bonding conditions. The multi-part tool allows measurement of several distinct independent parameters which are, in turn, used to solve for secondary parameters that give information about the properties of the cement outside the casing. Secondary parameters affecting the measured signals are casing thickness, **bond** of **cement** to casing, cement acoustic impedance, channel size and channel material. By measuring as many independent parameters as there are secondary parameters, the values of the secondary parameters can be calculated. The logging tool comprises a tool body having a longitudinal axis, a first transducer perpendicular to the axis, spaced second and third transducers at angles of 8 (deg) to 27(deg) to the axis, fourth and fifth transducers at angles of 8(deg) to 27(deg) to the axis, and a sixth transducer perpendicular to the axis.

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17 / 33 TULSA - ©TULS

TI - EMERGING GAS RESOURCES IN THE GREATER GREEN RIVER BASIN CONSORTIUM (DENVER, 4/28/97) PROCEEDINGS (ADVANCES IN DRILLING TECHNOLOGIES FOR THE NORTH AMERICAN ROCKIES)

SO - GAS RES INST REP NO GRI-97/0204 (NTIS PB98-105109) 1997 (197 PP; OVER 40 REFS)

AB - Materials from a one-day meeting devoted to the advances in drilling technologies for the North American Rocky Mt. area are assembled in this volume. They cover the following presentations: Improvement in Drilling Costs Through Technology Transfer in Rocky Mt. Basins; Successful Drilling Practices; Underbalanced Drilling in the Piceance Basin; Development of Slimhole Drilling Techniques to Reduce Well Costs for Gas Wells in SW. Wyoming; Coiled **Tubing** Drilling; The Development of a Mini-Disc Drill Bit; Integrated Underbalanced Directional Drilling System; Effects of Drilling Fluids on Shale Stability; Cement Vibration; and Closed Loop System as a Cost-Effective Alternative to Reserve Pits. The presentation materials are preceded by an extensive bibliography.

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18 / 33 TULSA - ©TULS

TI - DRILLING OPTIMIZATION AND USE OF TITANIUM MOTOR RESULTS IN 40% REDUCTION IN SHORT RADIUS DRILLING TIME

SO - IADC/SPE DRILLING CONF (DALLAS, 98.03.03-06) PROC PP 945-957, 1998 (IADC/SPE-39387)

AU - FRENCH, M R; SIAGIAN, M; SUTCLIFFE, B C; JONES, J

AB - A case history is presented of 12 reentry short radius horizontal wells drilled in the Minas field of central Sumatra, Indonesia. These wells were drilled in 2 packages of 6 wells each. The first package was drilled using an articulated motor system. With preliminary well preparation conducted by a well service rig, well designed milling/drill-in fluids, and consistent sidetrack plug procedures, the first package was drilled under budget. Improvements to both the milling procedure and the directional program resulted in a 40% reduction in drilling time for the second package. The directional program for the second package also utilized a new short radius drilling system centered around a 4.75-in. titanium steerable motor. This project was the first time the titanium motor had been used in the field.

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19 / 33 TULSA - ©TULS

TI - RE-ENTRY DRILLING - WHAT ARE YOUR LIMITS TO APPLICATIONS

SO - 1ST ANNU PETROL NETWORK EDUC CONF (PNEC) NEW & EMERGING TECHNOL PACIFIC RIM CONF (SINGAPORE, 96.11.18-20) PROC PAP NO 13, 1996 (6 PP)

AU - CROUSE, P C

AB - Advancements in drilling slimhole wells out of existing well bores, with sufficient lateral lengths, and with the capability to log the slimholes as well as compete with fully isolated systems has caused a new look at the reentry market, especially offshore where slots are at a premium. A word of caution must still be given about application criteria and selection of candidates for the reentry options. This paper discusses the drilling processes and application of reentry drilling along with the risks associated with the reentry decision.

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20 / 33 TULSA - ©TULS

TI - SLIMHOLE LATERAL WELL DRILLING ACROSS FAULTS FROM 4- 1/2" CASED PRODUCERS IN THE DENVER-JULESBURG BASIN, COLORADO

SO - SPE EAST REG MTG (LEXINGTON, KY, 95.10.22-24) PROC PP 125-137, 1997 (SPE-39226; 1 REF)

AU - BOONE, L E; CLAUSEN, F J; BIRMINGHAM, T J; SCHAPPERT, N

AB - The first slimhole lateral drilling from 4.5-in. cased wells in the Denver-Julesberg Basin was performed in 1996. This project also included the first reported lateral drilling in Colorado using coiled **tubing** and the first reported lateral cementing operations of 2-3/8 in. and 2- 7/8 in. liners in the Rocky Mt. The main objective of the project was to develop reserves with minimum surface impact and operating costs by utilizing existing locations. The following factors were key to the success of these slimhole lateral wells: (1) an accurate interpretation of fault location, (2) minimizing the amount of fractured interval encountered in the overlying Pierre Shale in which the casing **window** is located, (3) maintaining dogleg control to allow for cased hole tool access, (4) using slimhole mud motors with maximum durability, and (5) using a stable hydraulic fracturing fluid.

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21 / 33 TULSA - ©TULS

TI - MULTI-LATERAL HORIZONTAL DRILLING PROBLEMS & SOLUTIONS EXPERIENCED OFFSHORE ABU DHABI

SO - 7TH ABU DHABI NAT OIL CO (ADNOC)/SPE ET AL ABU DHABI INT PETROL CONF (ABU DHABI, UAE, 96.10.13-16) PROC PP 844-855, 1996 (SPE-36252; 2 REFS)

AU - ISMAIL, G; EL-KHATIB, H

AB - ZADCO's offshore oil field is a stacked reservoir system and is considered an optimum candidate for horizontal drilling applications. The latest horizontal drilling technology is used to drill complex multilateral horizontal wells that include multilaterals in different directions from parent well bore; multilaterals with 2 branches in one thin reservoir; and multilaterals with stair-step/transverse trajectories. Several problems were encountered while planning, drilling, completing and stimulating the complex multilateral horizontal wells: maintaining zonal

isolation among the various reservoirs; minimizing the drilled footage through tight barriers/poor facies to control sweep efficiency and to delay water breakthrough by drilling stair step or traverse hole trajectory; anchor-stock utilization; drilling multilateral horizontal wells with low departure target; the development of thin and tight oil reservoir; minimizing casing **cement bond** failure by drilling multilateral holes from one **window**; target centralization within multilateral sections in different directions; and stimulation of multilateral barefoot completion.

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22 / 33 TULSA - ©TULS

TI - CEMENTING MULTILATERAL WELL WITH LATEX CEMENT

SO - SPE/IADC DRILLING CONF (AMSTERDAM, NETH, 97.03.04-06) PROC PP 431-435, 1997 (SPE/IADC-37623; 5 REFS)

AU - ABDUL-RAHMAN, R; CHONG, A

AB - One of the latest techniques in enhancing current production is the multilateral well. A multilateral well is a well having one or more branches or lateral sections from its main bore exiting through windows milled in the main casing strings. The lateral sections can be open-hole or cased-hole. When they are cased-hole, the cement integrity for casing support and zonal isolation is of utmost importance. For cementing the lateral sections of multilateral wells, it is important to have a cement with high strength and durability to support the liner throughout the well's life-span. Latex cement is commonly used for its gas migration control property. However, this paper presents a case history where latex cement was used to successfully cement the first multilateral well with cemented junction in the Asia-Pacific. Operational data are presented and discussed. Laboratory data are also presented to illustrate the advantages of latex cement for this application as compared to non-latex cement.

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23 / 33 TULSA - ©TULS

TI - SEISMOGRAM SYNTHESIS FOR RADIALLY LAYERED MEDIA USING THE GENERALIZED REFLECTION/TRANSMISSION COEFFICIENTS METHOD: THEORY AND APPLICATIONS TO ACOUSTIC LOGGING

SO - 64TH ANNU SEG INT MTG (LOS ANGELES, 94.10.23-28) PAP; GEOPHYSICS V 61, NO 4, PP 1150-1159, JULY-AUG 1996 (12 REFS)

AU - CHEN, X; QUAN, Y; HARRIS, J M

AB - A new method based on generalized reflection and transmission coefficients is proposed to calculate the synthetic seismograms in radially multilayered media. This method can be used to efficiently simulate full waveform acoustic logs and crosswell seismic profiles in situations where it is needed to consider **borehole** effects. The new formulation is tested by comparing the numerical results with previous available work and shows excellent agreement. Because of the use of the normalized Hankel functions and the normalization factors, this new algorithm for computing seismograms is stable numerically even for high-frequency problems. To show the applicability of this new approach to full waveform sonic logging, it is applied to investigate the effects of complex invaded zones on the geometrical spreading and attenuation estimation for P-waves. It is found that a damaged zone (its velocity is slower than the unperturbed formation velocity) exhibits a convergence effect on the P-waves, and a flushed zone (velocity is faster than the unperturbed formation velocity) exhibits a divergence effect on the P-waves.

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24 / 33 TULSA - ©TULS

TI - AN ACOUSTIC SONDE TRANSDUCER ARRAY AND METHODS OF BEAM STEERING AND FOCUSING

SO - GR BRIT 2,287,789A, P 95.09.27, F 95.03.22, PR US 94.03.22 (APPL 216,648) (G01V-001/40; B06B-001/06) (66 PP; 56 CLAIMS)

AU - SCHMIDT, M G; PRIEST, J F

AB - An acoustic transducer array for a sonde and methods of beam steering and focusing are

described. The transducer array comprises an annular array of piezoelectric elements on an acoustic attenuating backing which employs the selective use of mechanical and electronic beam focusing, electronic beam steering and amplitude shading to increase resolution and overcome side lobe effects. A signal reconstruction technique utilizes independent array element transmission and reception, creating focusing and beam steering. The configuration of the transducer array is preferably cylindrical, but may be conical, biconical, convex, concave or may take the form of a number of other suitable geometric configurations. The transducer array may incorporate a transformer block having an array of multiple transformers therein for connection to individual transducer circuits. The transformers may be fixed or may be capable of being mechanically tuned as desired.

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25 / 33 TULSA - ©TULS

TI - HORIZONTAL DRILLING RESTORES FIELD OUTPUT

SO - WORLD OIL V 213, NO 7, PP 99-101,104-106, JULY 1992 (13 REFS)

AU - POCOVI, A S; POZZO, D A; GUSTAVINO, L L

AB - TWENTY-SEVEN HORIZONTAL WELLS HAVE BEEN DRILLED IN ARGENTINA. ALL BUT 3 OF THEM WERE DRILLED FROM EXISTING VERTICAL WELLS. RESERVOIRS DRILLED WERE OF VARYING NATURE, BUT MOST OF THEM CONSISTED OF TIGHT SANDSTONES, WHILE A FEW INVOLVED CALCAREOUS MATERIAL, QUARTZITES, AND ROCKS OF VOLCANIC ORIGIN. SUCH IS THE CASE OF YPF FR. P1. 21H, WHICH IS DESCRIBED. THE OBJECTIVE OF THE PROJECT WAS TO SALVAGE THE WELL. IT WAS THE FIRST HORIZONTAL WELL DRILLED IN ARGENTINA THROUGH HOST ROCKS WHOSE ORIGINAL PHYSICAL CHARACTERISTICS HAVE BEEN MODIFIED BY LATER PROCESSES, THEREBY RESULTING IN ATYPICAL RESERVOIRS. BECAUSE NO SECONDARY OR ENHANCED RECOVERY PROCESSES COULD BE APPLIED IN THE PALMAR LARGO FIELD, THE ONLY SOLUTION FOR FURTHER EXPLOITATION WAS TO DRILL HORIZONTAL WELLS.

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26 / 33 TULSA - ©TULS

TI - VELOCITY ANALYSIS OF MULTIRECEIVER FULL-WAVEFORM ACOUSTIC-LOGGING DATA IN OPEN AND CASED HOLES

SO - LOG ANAL V 32, NO 3, PP 188-200, MAY-JUNE 1991 (8 REFS)

AU - BLOCK, L V; CHENG, C H; DUCKWORTH, G L

AB - AVERAGED-SEMBLANCE AND MAXIMUM-LIKELIHOOD VELOCITY ANALYSES ARE APPLIED TO SYNTHETIC AND FIELD FULL-WAVEFORM ACOUSTIC- LOGGING DATA TO DETERMINE FORMATION VELOCITIES. THE GOAL IS TO COMPARE THE PERFORMANCES OF THE 2 METHODS UNDER VARIOUS **BOREHOLE** CONDITIONS. THE ABILITY OF THESE METHODS TO DETERMINE FORMATION VELOCITIES FROM DATA RECORDED IN POORLY BONDED CASED HOLES IS OF PARTICULAR INTEREST. FOR SYNTHETIC OPEN-HOLE DATA THE VELOCITY ANALYSES YIELD RESULTS WITHIN 4% OF THE TRUE VELOCITIES. RESULTS FROM SYNTHETIC WELL- BONDED CASED-HOLE DATA ARE GENERALLY AS GOOD AS THOSE FROM THE OPEN-HOLE DATA. FOR CASED-HOLE MODELS IN WHICH THE STEEL PIPE IS NOT **BONDED** TO THE SURROUNDING **CEMENT** (THE FREE PIPE SITUATION), THE MEASURED P-WAVE VELOCITIES ARE TYPICALLY 6 TO 8% LESS THAN THE FORMATION VELOCITIES. BOTH METHODS PERFORM EQUALLY WELL ON FIELD DATA FROM OPEN BOREHOLES AND WELL-BONDED CASED HOLES AND ON FIELD DATA FROM FREE PIPE SITUATIONS WHEN THE FORMATION VELOCITY IS LOW COMPARED WITH THE VELOCITY OF THE PIPE. THE MAXIMUM-LIKELIHOOD METHOD YIELDS BETTER RESULTS THAN SEMBLANCE FOR DATA FROM A FREE PIPE SITUATION IN A FORMATION WITH A P- WAVE VELOCITY OF APPROX. 5.5 TO 5.7 KM/S.

27 / 33 TULSA - ©TULS

TI - (R) LOGGING METHOD AND APPARATUS FOR ACOUSTIC INSPECTION OF A **BOREHOLE** FITTED WITH CASING

SO - CAN 2,014,875, P 90.10.26, F 90.04.19, PR FR 89.04.26 (APPL 8,905,520) (G01V-001/40) (24 PP; 15 CLAIMS) SRPA# 497,520

AU - WRIGHT, P

AB - (FOR ABSTRACT, SEE ABSTRACT #497,520)

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28 / 33 TULSA - ©TULS

TI - METHOD AND APPARATUS FOR THE ACOUSTIC INVESTIGATION OF A CASING CEMENTED IN A **BOREHOLE**

have US

SO - EUROPE 395,499, P 90.10.31, F 90.04.25, PR FR 89.04.26 (APPL 8,905,520) (G01V-001/40) (14 PP; 15 CLAIMS)

AU - WRIGHT, P

AB - A METHOD IS DESCRIBED FOR DETERMINING THE **CEMENT BONDING** AND CASING THICKNESS OF A CASING CEMENTED IN A **BOREHOLE**. THESE CHARACTERISTICS ARE DETERMINED FROM A REFLECTED ACOUSTIC SIGNAL S (T) OBTAINED BY DIRECTING AN ACOUSTIC PULSE AT A NORMAL INCIDENCE TOWARD A RADIAL SECTOR OF THE WALL OF THE CASING, THE PULSE STIMULATING THICKNESS RESONANCE WITHIN THE WALLS OF THE CASING. THE METHOD COMPRISES THE STEPS OF (1) DEFINING A FIRST TIME **WINDOW** CORRESPONDING TO A FIRST PORTION OF SIGNAL S(T), INCLUDING THE INITIAL REFLECTION FROM THE CASING AND SUBSEQUENT ACOUSTIC RETURNS DUE TO RESONANCE, (2) DEFINING A SECOND TIME **WINDOW** CORRESPONDING TO A SECOND PORTION OF SIGNAL S(T), ONLY INCLUDING THE INITIAL REFLECTION FROM THE CASING, AND (3) DETERMINING THE CASING CHARACTERISTIC FROM INFORMATION RELATED TO RESONANCE CONTAINED IN THE FIRST TIME **WINDOW** WHILE NORMALIZING THE INFORMATION BY INFORMATION CONTAINED WITHIN THE SECOND TIME **WINDOW**.

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29 / 33 TULSA - ©TULS — have US

TI - DETERMINING IMPEDANCE OF MATERIAL BEHIND A CASING IN A **BOREHOLE**

SO - US 4,928,269, C 90.05.22, F 89.06.15, PR US 88.10.28 (APPL 264,468) (G01V-001/40) (19 PP; 67 CLAIMS)

AU - KIMBALL, C V; STANKE, F E; RANDALL, C J; HAYMAN, A J

AB - A METHOD IS DESCRIBED FOR CALCULATING THE IMPEDANCE OF A MATERIAL BEHIND A SECTION OF WELL CASING. AN ACOUSTIC EXCITATION PULSE IS DIRECTED TOWARD THE CASING, RESULTING IN A RETURN WAVEFORM HAVING A REVERBERATION SEGMENT AND AN INITIAL REFLECTION SEGMENT. THE RETURN WAVEFORM IS ANALYZED TO CHOOSE A RESONANCE FREQEUNCY INDICATIVE OF THE CASING'S NOMINAL THICKNESS. THE RETURN WAVEFORM IS BANDPASS FILTERED ABOUT THE CHOSEN FREQUENCY. A TIME **WINDOW** OF THE REVERBERATION SEGMENT IS SELECTED, AND THE ENERGY CONTENT IN THE TIME **WINDOW** OF THE FILTERED REVERBERATION SEGMENT IS CALCULATED. BOTH THE BANDPASS FILTER AND TIME WINDOWS ARE SELECTED ON THE BASIS OF THE CHOSEN RESONANCE FREQUENCY, THEREBY REMOVING VARIATIONS IN THE THICKNESS OF THE CASING. THE ENERGY CONTENT CALCULATION PRODUCES A CEMENTATION SIGNAL INDICATIVE OF THE IMPEDANCE OF THE CEMENT BEHIND THE SECTION OF THE CASING. THE IMPEDANCE VALUE IS INDICATIVE OF THE CEMENT QUALTIY.

30 / 33 TULSA - ©TULS

TI - METHOD OF LOCATING A MEMBER SUCH AS A GEOPHONE IN A **BOREHOLE**

SO - GR BRIT 2,214,638A, P 89.09.06, F 88.01.28 (APPL 8,801,881) (G01V-001/40; H02G-009/06) (17 PP; 20 CLAIMS)

AU - MEADOWS, A

AB - GEOPHONE MODULES ARE SPACED ALONG A LONG HORIZONTAL **BOREHOLE** IN A COAL SEAM BY PUMPING GROUT FROM A GROUT TANK INTO A BREECH ASSEMBLY AND SELECTIVELY PASSING THE MODULES FROM THE BREECH ASSEMBLY THROUGH **GATE** VALVES AND INTO A DRILL STRING INSERTED IN A **BOREHOLE**. THE MODULES ARE CONNECTED BY A TRAILING SIGNAL CABLE AND AN ANCHOR MODULE SECURES THE CABLE AT THE FAR END OF THE **BOREHOLE**. THE MODULES CARRY INCLINOMETERS AND CAN BE ORIENTATED IN THE **BOREHOLE** BEFORE THE GROUT SETS THEM IN POSITION. THE GROUT IS PUMPED ALONG THE DRILL STRING AND BACK ALONG AN ANNULAR SPACE WITHIN A CASING AND THROUGH A CONTROL VALVE. THE ANCHOR MODULE HAS SPRUNG ARMS TO ENGAGE THE **BOREHOLE** AND A FULL VALVE WHICH IS OPENED WHEN THE MODULE IS IN THE BREECH BUT CLOSES WHEN PUMPING STARTS. THE GEOPHONES MAY BE ROTATED BY A MOTOR ON EACH MODULE TO ACHIEVE THE DESIRED ORIENTATION. THE COAL SEAM IS MONITORED BETWEEN THE **BOREHOLE** AND ANOTHER SIMILAR **BOREHOLE** ALONG THE SEAM WHEN THE GROUT HAS SET.

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31 / 33 TULSA - ©TULS

TI - DETECTION OF EXTERNAL PIPE DEFECTS WITH A MODIFIED **BOREHOLE** TELEVIEWER

SO - 29TH ANNU SPWLA LOGGING SYMP (SAN ANTONIO, 88.06.05-08) TRANS V 2, PAP NO UU, 1988 (20 PP; 11 REFS)

AU - KATAHARA, K W; KYLE, D G; SIEGFRIED, R W; GARD, M F; GOODWILL, W P; SCHASTEEN, T; PETERMANN, S G

AB - THE CONVENTIONAL ULTRASONIC TELEVIEWER IS CAPABLE OF PRECISE AND DETAILED MAPPING OF THE TOPOGRAPHY OF THE **BOREHOLE** WALL OR OF THE INNER SURFACE OF CASING AND PRODUCTION **TUBING**. A PROTOTYPE TELEVIEWER THAT IS ALSO CAPABLE OF DETERMINING PIPE WALL THICKNESS WITH THE SAME DETAIL HAS BEEN TESTED. THE MAJOR FUNCTIONAL MODIFICATIONS IN THIS TOOL RELATIVE TO THE PREVIOUS TELEVIEWER ARE (1) THAT THE ULTRASONIC TRANSDUCER IS EXPOSED DIRECTLY TO THE **BOREHOLE** FLUID WITHOUT AN INTERVENING **WINDOW**; AND (2) THAT THE ULTRASONIC SIGNAL IS DIGITIZED DOWN HOLE FOR LATER TRANSMISSION UP THE WIRELINE. A MICROPROCESSOR IN THE TOOL CONTROLS THE MEASUREMENT PROCESS AND CAN PERFORM SIGNIFICANT PORTIONS OF THE SIGNAL PROCESSING DOWN HOLE. ALTHOUGH THE SYSTEM WAS DESIGNED TO BE REAL-TIME CALCULATIONS, THE DATA ARE CURRENTLY RECORDED AT THE SURFACE AND ARE SUBSEQUENTLY PROCESSED TO OBTAIN THICKNESSES. THE PROTOTYPE DIGITAL ULTRASONIC SCANNING TOOL (DUST) HAS BEEN TESTED IN PIPE WITH WELL-CHARACTERIZED EXTERNAL DEFECTS, AND SOME EXAMPLES OF TEST RESULTS ARE SHOWN. ALTHOUGH THE INITIAL GOAL WAS TO DETECT EXTERIOR CORROSION ON PIPE, OTHER APPLICATIONS SUCH AS **CEMENT BOND** LOGGING ARE POSSIBLE.

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32 / 33 TULSA - ©TULS

TI - METHOD AND APPARATUS FOR EVALUATING THE QUALITY OF THE CEMENT AROUND THE WELL CASING (PROCEDE ET DISPOSITIF POUR EVALUER LA QUALITE DU CIMENT ENTOURANT LE TUBAGE D'UN PUITS)

SO - EUROP 176,400, P 86.04.02, F 85.08.23, PR FR 84.08.24 (APPL 8,413,220) (SCHLUMBERGER SOC PR ELECTR) AND (SCHLUMBERGER LTD) (IN FRENCH) (17 CLAIMS, 4 PP)

AU - CATALA, G; STOWE, I; HENRY, D

AB - THIS APPARATUS FOR EVALUATING THE QUALITY OF THE **CEMENT BOND** AROUND THE CASING IN A **BOREHOLE** CONSISTS OF A SONDE WITH ULTRASONIC TRANSMITTER-RECEIVERS, AFFECTING DIFFERENT ANGULAR ZONES AROUND THE WELL. A REFERENCE TRANSDUCER IS ALSO PROVIDED WHICH YIELDS MEASUREMENTS OF THE FLUID WHICH FILLS THE INTERIOR OF THE WELL. THE ENERGY OF THE SIGNAL RECEIVED BY THE TRANSDUCER IS MEASURED IN 3 WINDOWS, THE FIRST OF WHICH CORRESPONDS TO THE FIRST ECHO AND THE OTHERS MEASURE THE RATIO OF ENERGIES WITH RESPECT TO THE FIRST ONE. THESE RAW MEASUREMENTS ARE THEN NORMALIZED TO EVALUATE THE QUALITY OF THE **CEMENT BOND** AROUND THE CASING. (17 CLAIMS, 4 PP)

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33 / 33 TULSA - ©TULS

TI - APPARATUS FOR AND A METHOD OF LOCATING A DISCONTINUITY IN THE MEDIUM SURROUNDING A TEST BORE

SO - CAN 1,033,849, C 78.06.27, F 75.01.06 (APPL 217,371); GAMMATEST MATER TEST LTD

AU - PREISS, K

AB - AN APPARATUS IS DESCRIBED FOR LOCATING A DISCONTINUITY IN THE CEMENT SURROUNDING A **BOREHOLE**. A PROBE HAS AN AXIALLY EXTENDING TUBULAR HOUSING THAT IS SEALED AT EACH END. AN OMNIDIRECTIONAL RADIATION SOURCE IS ASSOCIATED WITH THE HOUSING AND A RADIATION DETECTOR. AN ELECTRIC CABLE PASSES THROUGH AN END OF THE HOUSING FOR OPERATING THE DETECTOR. A REMOVABLE SHIELD IS MOUNTED ON THE HOUSING IN AN AXIAL POSITION THAT OVERLIES THE DETECTOR, THE SHIELD COMPRISING A CYLINDRICAL METALLIC SLEEVE HAVING MEANS DEFINING A RADIATION TRANSPARENT **WINDOW** THAT EXTENDS AXIALLY ALONG THE SLEEVE AND CIRCUMFERENTIALLY UP TO 180 OF ARC. THERE ARE MEANS FOR ROTATING AT LEAST THE SHIELD SO AS TO INDICATE THE ANGULAR POSITION OF THE TRANSPARENT **WINDOW** WITH RESPECT TO A REFERENCE. (11 CLAIMS)

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